

CLAIMS

1. An agent for promoting HGF production comprising, as an effective ingredient, a disaccharide comprised of an uronic acid residue (wherein an uronic acid means an iduronic acid or a glucuronic acid, and has the same meaning hereinafter) and a glucosamine residue that are connected by α 1,4-glycosidic linkage or β 1,4-glycosidic linkage, or tri- to hexadeca-saccharides having a structure in which uronic acid residue(s) and glucosamine residue(s) are alternately and repeatedly connected by α 1,4-glycosidic linkage or β 1,4-glycosidic linkage, wherein at least one hydroxy group of the uronic acid residue(s) and/or the glucosamine residue(s) may be sulfated, alkylated, acylated or aminated, and/or amino group at position 2 of at least one of the glucosamine residue(s) may be sulfated, alkylated or acylated, or a salt thereof.
2. The agent for promoting HGF production according to claim 1, wherein the hydroxy group at position 2 of at least one of the uronic acid residue(s) and/or the hydroxy group at positions 3 and/or 6 of at least one of the glucosamine residue(s) may be sulfated.
3. The agent for promoting HGF production according to claim 1 or 2, wherein the hydroxy group at position 6 and/or the amino group at position 2 of at least one of the glucosamine residue(s) is sulfated.
4. The agent for promoting HGF production according to any one

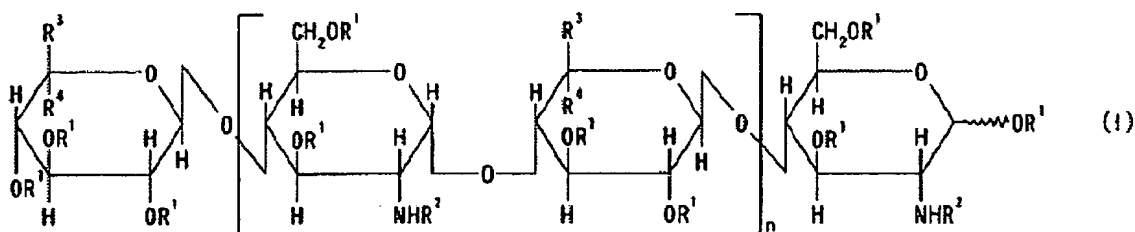
of claims 1 to 3, wherein the oligosaccharide is di- to deca-saccharide.

5. The agent for promoting HGF production according to any one of claims 1 to 4, wherein the oligosaccharide is a degradation product prepared from high-molecular-weight heparin or high-molecular-weight heparan sulfate by digestion with heparinase or heparitinase.

6. The agent for promoting HGF production according to any one of claims 1 to 4, wherein the oligosaccharide is a degradation product prepared from high-molecular-weight heparin or high-molecular-weight heparan sulfate by digestion by any one of nitrous acid degradation, hydrogen peroxide degradation or β -elimination.

7. The agent for promoting HGF production according to claim 1, wherein the oligosaccharide is any one of compounds represented by the following (a) to (h);

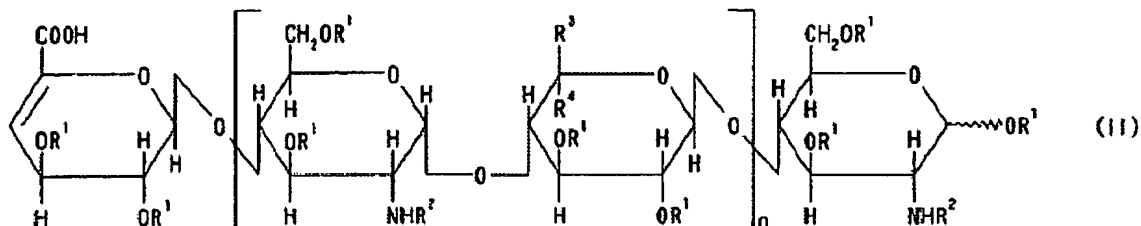
(a) formula (I):



wherein R^1 represents hydrogen, sulfate group, alkyl, acyl, or optionally substituted amino group, R^2 represents hydrogen, sulfate group, alkyl or acyl group, R^3 and R^4 are different from each other and represent hydrogen or optionally substituted

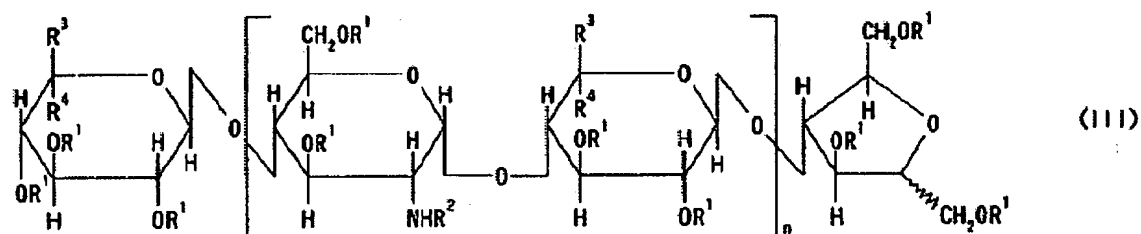
carboxyl group, and n represents 0 to 7,

(b) formula (II):



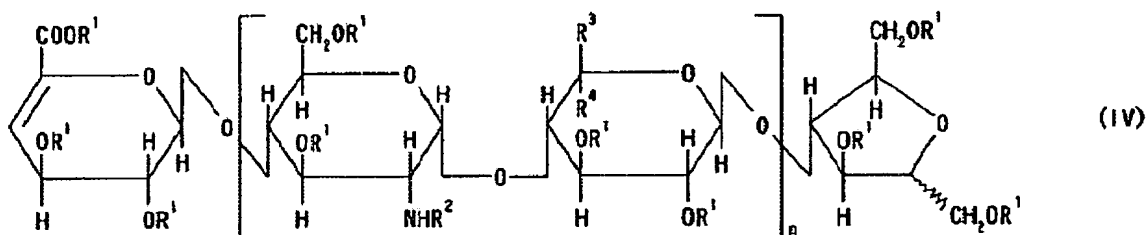
wherein all the symbols are respectively the same as defined
5 above,

(c) formula (III):



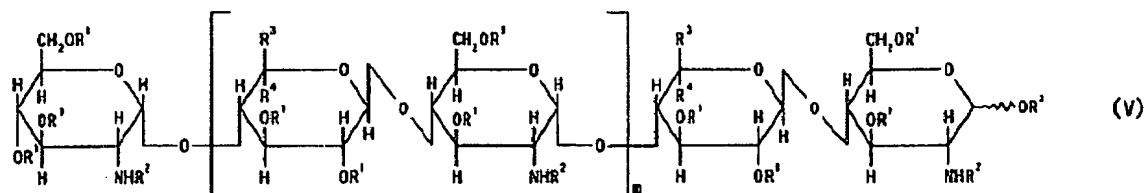
wherein all the symbols are respectively the same as defined
above,

10 (d) formula (IV):



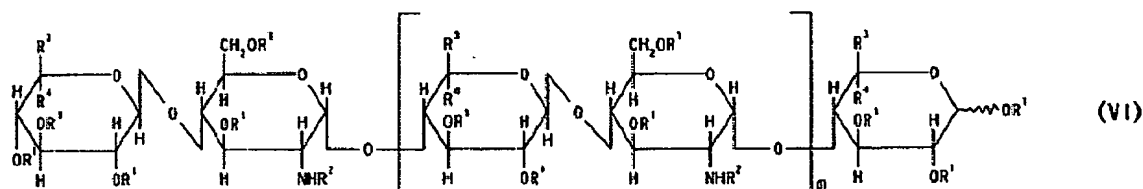
wherein all the symbols are respectively the same as defined
above,

(e) formula (V):



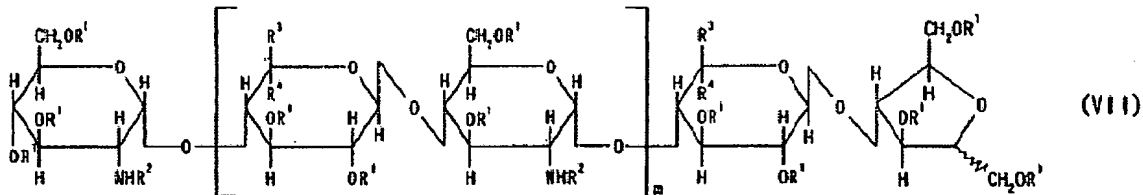
wherein m represents 0 to 6, and R^1 , R^2 , R^3 and R^4 are respectively the same as defined above,

(f) formula (VI):



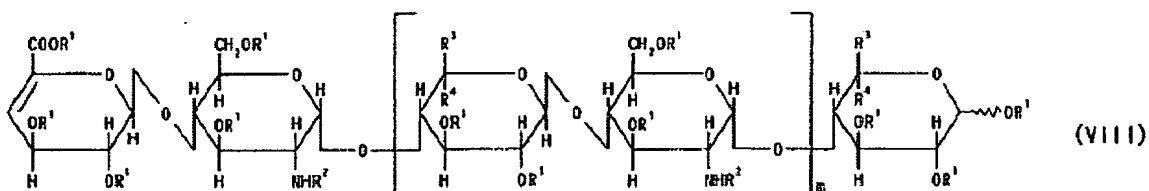
wherein m represents 0 to 6, and R^1 , R^2 , R^3 and R^4 are respectively the same as defined above,

(g) formula (VII)



wherein m represents 0 to 6, and R^1 , R^2 , R^3 and R^4 are respectively the same as defined above, and

(h) formula (VIII)



wherein m represents 0 to 6, and R^1 , R^2 , R^3 and R^4 are respectively the same as defined above.

8. An agent for promoting HGF production comprising, as an

effective ingredient, a sugar chain compound having a structure in which uronic acid residue(s) and glucosamine residue(s) are alternately and repeatedly connected by α 1,4-glycosidic linkage or β 1,4-glycosidic linkage, wherein the hydroxy group at position 6 of at least one of the glucosamine residue(s) is sulfated, or a salt thereof.

9. An agent for promoting HGF production comprising, as an effective ingredient, a sugar chain compound having a structure in which uronic acid residue(s) and glucosamine residue(s) are alternately and repeatedly connected by α 1,4-glycosidic linkage or β 1,4-glycosidic linkage, wherein the amino group at position 2 of at least one of the glucosamine residue(s) is sulfated, or a salt thereof.

10. An agent for promoting HGF production comprising, as an effective ingredient, a disaccharide compound comprised of an uronic acid residue and a glucosamine residue wherein the hydroxy group at position 6 of the glucosamine residue and/or the amino group at position 2 of the glucosamine residue are/is sulfated are connected by α 1,4-glycosidic linkage or β 1,4-glycosidic linkage, or a salt thereof.

11. The agent for promoting HGF production according to any one of claims 1 to 10, wherein the sugar chain compound or a salt thereof has no or reduced anti-blood coagulation activity and/or lipoprotein lipase releasing activity.

12. A method of promoting HGF production characterized by

administering to a mammal an effective amount of a disaccharide composed of an uronic acid residue (wherein an uronic acid means an iduronic acid or a glucuronic acid, and has the same meaning hereinafter) and a glucosamine residue that are connected by α 1,4-glycosidic linkage or β 1,4-glycosidic linkage, or tri- to hexadeca-saccharides having a structure in which uronic acid residue(s) and glucosamine residue(s) are alternately and repeatedly connected by α 1,4-glycosidic linkage or β 1,4-glycosidic linkage, wherein at least one hydroxy group of the uronic acid residue(s) and/or the glucosamine residue(s) may be sulfated, alkylated, acylated or aminated, and/or the amino group at position 2 of at least one of the glucosamine residue(s) may be sulfated, alkylated or acylated, or a salt.

13. The method of promoting HGF production according to claim 12, wherein the hydroxy group at position 2 of at least one of the uronic acid residue(s) and/or the hydroxy group at positions 3 and/or 6 of at least one of the glucosamine residue(s) may be sulfated.

14. The method of promoting HGF production according to claim 12, wherein the hydroxy group at position 6 and/or the amino group at position 2 of at least one of the glucosamine residue(s) is sulfated.

15. The method of promoting HGF production according to claim 12, wherein the oligosaccharide is di- to deca-saccharide.

16. The method of promoting HGF production according to claim

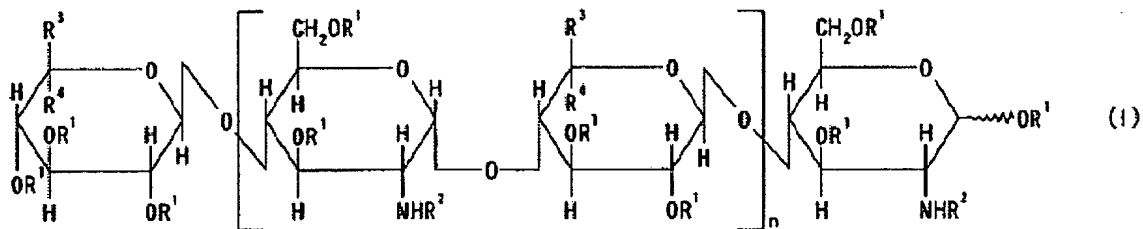
12, wherein the oligosaccharide is a degradation product prepared from high-molecular-weight heparin or high-molecular-weight heparan sulfate by digestion with heparinase or heparitinase.

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17. The method of promoting HGF production according to claim 12, wherein the oligosaccharide is a degradation product prepared from high-molecular-weight heparin or high-molecular-weight heparan sulfate by any one of nitrous acid degradation, hydrogen peroxide degradation or β -elimination.

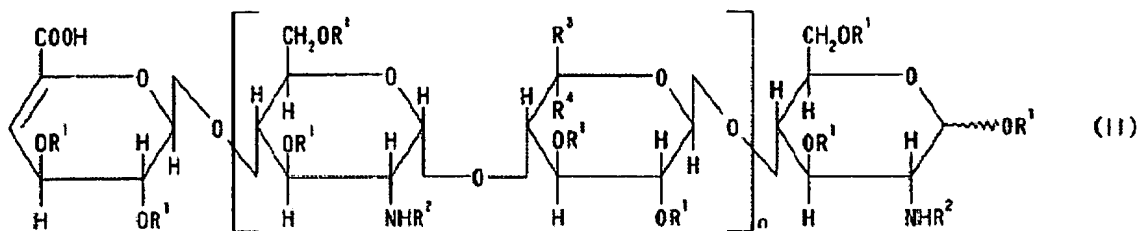
18. The method of promoting HGF production according to claim 12, wherein the oligosaccharide is any one of compounds represented by the following (a) to (h);

(a) formula (I):



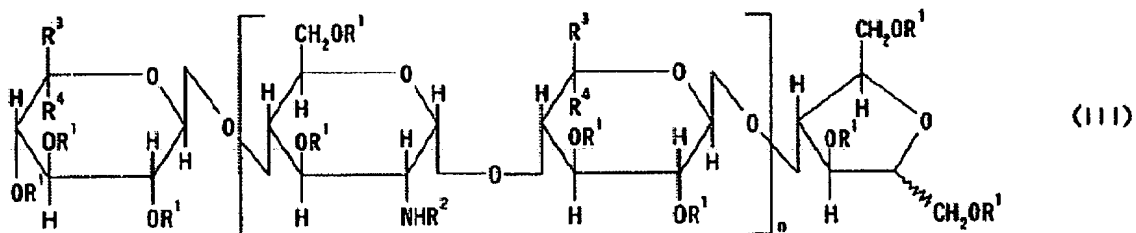
wherein R^1 represents hydrogen, sulfate group, alkyl, acyl, or optionally substituted amino group, R^2 represents hydrogen, sulfate group, alkyl or acyl group, R^3 and R^4 are different from each other and represent hydrogen or optionally substituted carboxyl group, and n represents 0 to 7,

(b) formula (II):



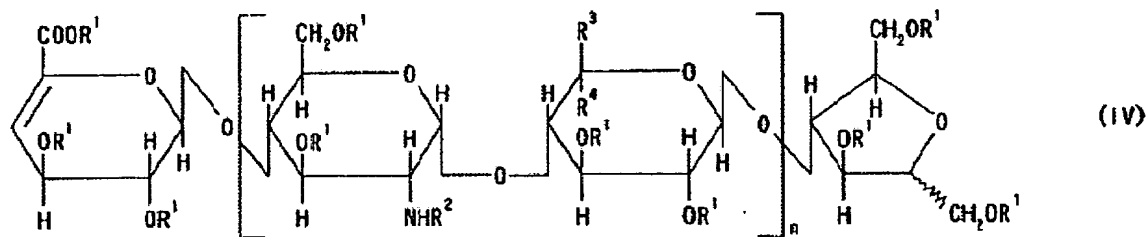
wherein all the symbols are respectively the same as defined above,

(c) formula (III):



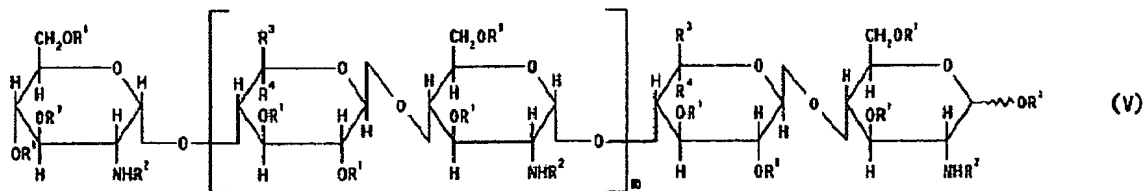
wherein all the symbols are respectively the same as defined above,

(d) formula (IV):



wherein all the symbols are respectively the same as defined above,

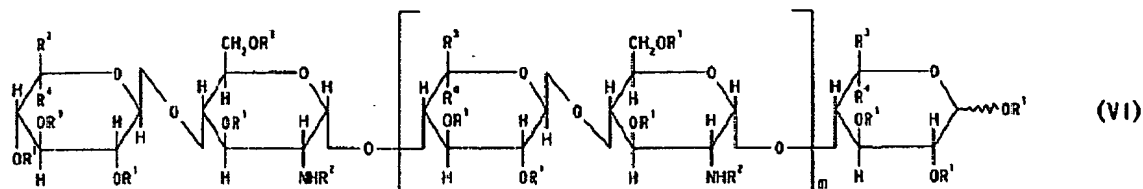
(e) formula (V):



wherein m represents 0 to 6, and R^1 , R^2 , R^3 and R^4 are respectively

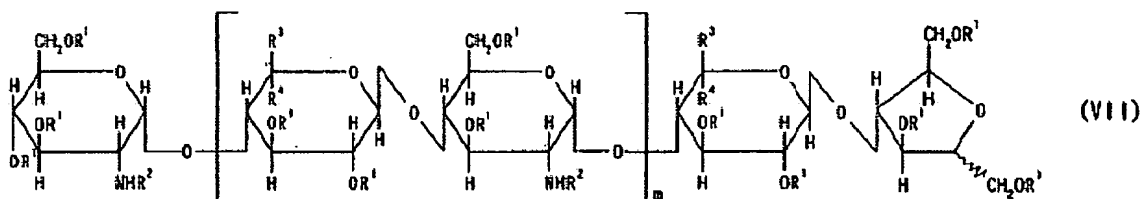
the same as defined above,

(f) formula (VI):



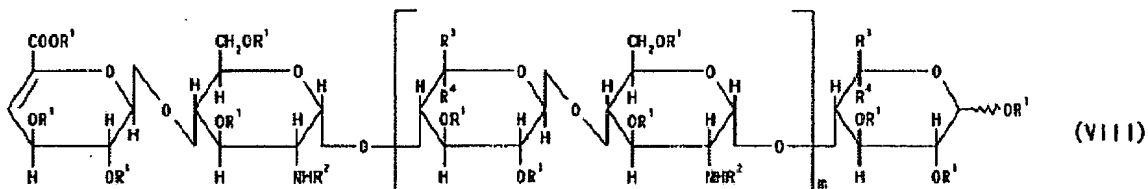
wherein m represents 0 to 6, and R^1 , R^2 , R^3 and R^4 are respectively
5 the same as defined above,

(g) formula (VII)



wherein m represents 0 to 6, and R^1 , R^2 , R^3 and R^4 are respectively
the same as defined above, and

(h) formula (VIII)



wherein m represents 0 to 6, and R^1 , R^2 , R^3 and R^4 are respectively
the same as defined above.

- 15 19. A method of promoting HGF production characterized by
administering to a mammal an effective amount of a sugar chain
compound having a structure in which uronic acid residue(s) and
glucosamine residue(s) are alternately and repeatedly
connected by α 1,4-glycosidic linkage or β 1,4-glycosidic
20 linkage, wherein the hydroxy group at position 6 of at least

one of the glucosamine residue(s) is sulfated, or a salt thereof.

20. A method of promoting HGF production characterized by
5 administering to a mammal an effective amount of a sugar chain compound having a structure in which uronic acid residue(s) and glucosamine residue(s) are alternately and repeatedly connected by α 1,4-glycosidic linkage or β 1,4-glycosidic linkage, wherein the amino group at position 2 of at least one
10 of the glucosamine residue(s) is sulfated, or a salt thereof.

21. A method of promoting HGF production characterized by administering to a mammal an effective amount of a disaccharide compound comprised of an uronic acid residue and a glucosamine
15 residue in which the hydroxy group at position 6 and/or the amino group at position 2 of the glucosamine residue are/is sulfated are connected by α 1,4-glycosidic linkage or β 1,4-glycosidic linkage, or a salt thereof.

20 22. The method of promoting HGF production according to any one of claims 12 to 21, wherein the sugar chain compound or a salt thereof has no or reduced anti-blood coagulation activity and/or lipoprotein lipase releasing activity.

25 23. Use of a disaccharide composed of an uronic acid residue (wherein an uronic acid means an iduronic acid or a glucuronic acid, and has the same meaning hereinafter) and a glucosamine residue that are connected by α 1,4-glycosidic linkage or β 1,4-glycosidic linkage, or tri- to

hexadeca-saccharides having a structure in which uronic acid residue(s) and glucosamine residue(s) are alternately and repeatedly connected by α 1,4-glycosidic linkage or β 1,4-glycosidic linkage, wherein at least one hydroxy group of the uronic acid residue(s) and/or the glucosamine residue(s) may be sulfated, alkylated, acylated or aminated, and/or the amino group at position 2 of at least one of the glucosamine residue(s) may be sulfated, alkylated or acylated, or a salt thereof, for the production of a medicament for promoting HGF production.

24. The use according to claim 23, wherein the hydroxy group at position 2 of at least one of the uronic acid residue(s) and/or the hydroxy group at positions 3 and/or 6 of at least one of the glucosamine residue(s) may be sulfated.

25. The use according to claim 23, wherein the hydroxy group at position 6 and/or the amino group at position 2 of at least one of the glucosamine residue(s) is sulfated.

26. The use according to claim 23, wherein the oligosaccharide is di- to deca-saccharide.

27. The use according to claim 23, wherein the oligosaccharide is a degradation product prepared from high-molecular-weight heparin or high-molecular-weight heparan sulfate by digestion with heparinase or heparitinase.

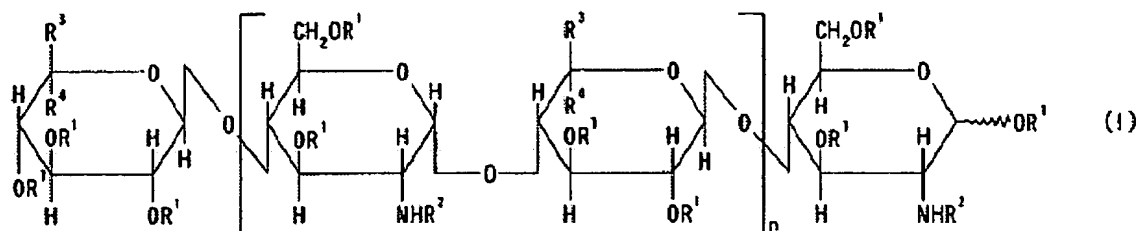
28. The use according to claim 23, wherein the oligosaccharide

is a degradation product prepared from high-molecular-weight heparin or high-molecular-weight heparan sulfate by any one of nitrous acid degradation, hydrogen peroxide degradation or β -elimination.

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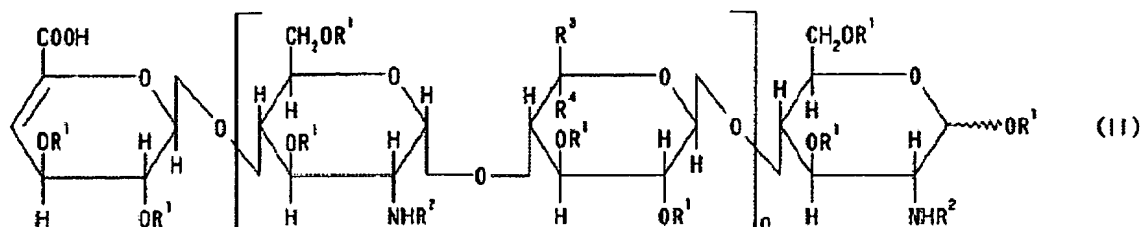
29. The use according to claim 23 wherein the oligosaccharide is any one of compounds represented by the following (a) to (h);

(a) formula (I):



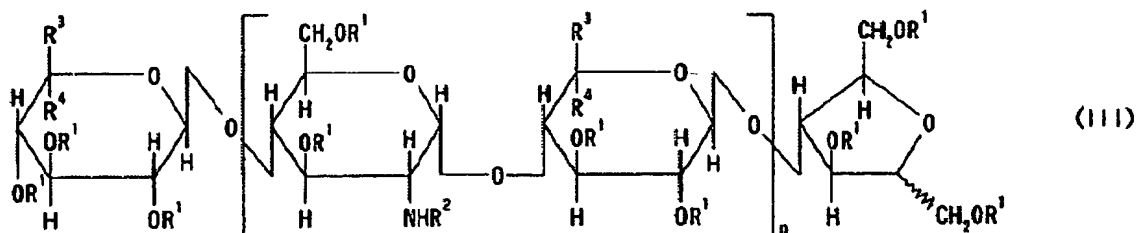
10 wherein R^1 represents hydrogen, sulfate group, alkyl, acyl, or optionally substituted amino group, R^2 represents hydrogen, sulfate group, alkyl or acyl group, R^3 and R^4 are different from each other and represent hydrogen or optionally substituted carboxyl group, and n represents 0 to 7,

15 (b) formula (II):



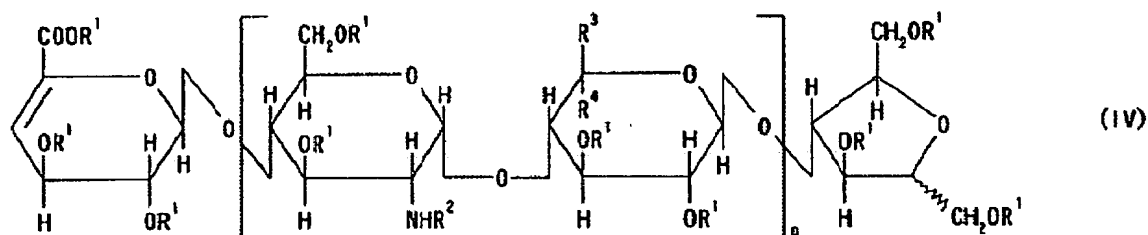
wherein all the symbols are respectively the same as defined above,

(c) formula (III):



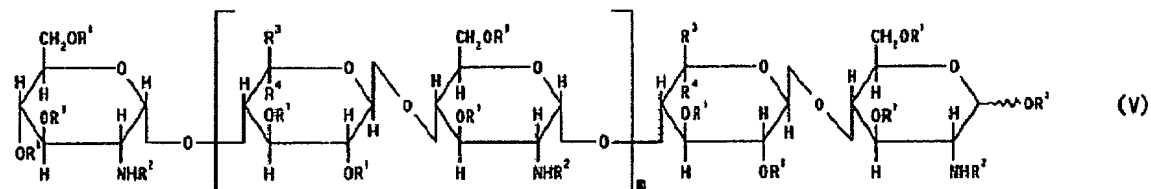
wherein all the symbols are respectively the same as defined above,

(d) formula (IV):



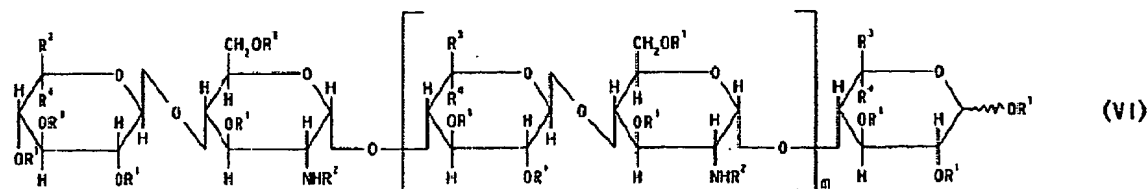
wherein all the symbols are respectively the same as defined above,

(e) formula (V):



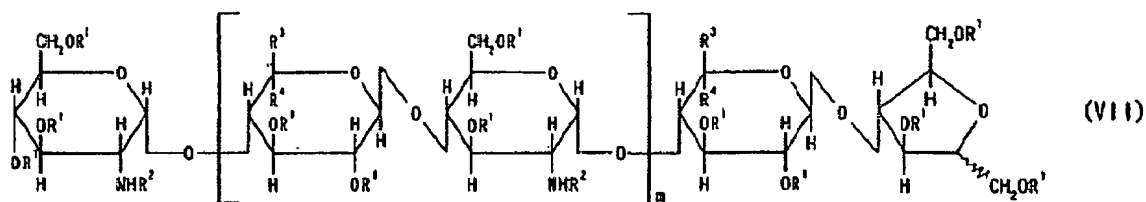
wherein m represents 0 to 6, and R^1 , R^2 , R^3 and R^4 are respectively the same as defined above,

(f) formula (VI):



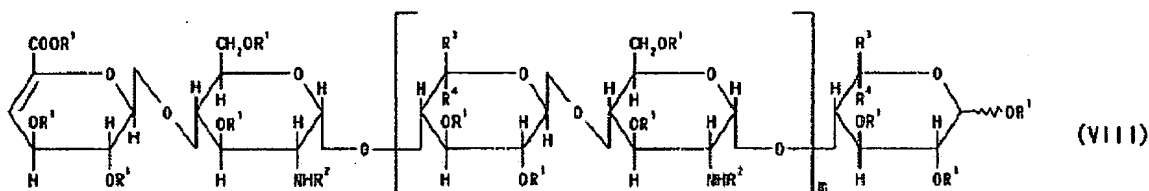
wherein m represents 0 to 6, and R^1 , R^2 , R^3 and R^4 are respectively the same as defined above,

(g) formula (VII)



wherein m represents 0 to 6, and R^1 , R^2 , R^3 and R^4 are respectively the same as defined above, and

5 (h) formula (VIII)



wherein m represents 0 to 6, and R^1 , R^2 , R^3 and R^4 are respectively the same as defined above.

10 30. Use of a sugar chain compound having a structure in which uronic acid residue(s) and glucosamine residue(s) are alternately and repeatedly connected by $\alpha 1,4$ -glycosidic linkage or $\beta 1,4$ -glycosidic linkage, wherein the hydroxy group at position 6 of at least one of the glucosamine residue(s) is

15 sulfated, or a salt thereof, for the production of a medicament for promoting HGF production.

31. Use of a sugar chain compound having a structure in which uronic acid residue(s) and glucosamine residue(s) are

20 alternately and repeatedly connected by $\alpha 1,4$ -glycosidic linkage or $\beta 1,4$ -glycosidic linkage, wherein at least one amino group at position 2 of the glucosamine residue(s) is sulfated, or a salt thereof, for the production of a medicament for

promoting HGF production.

32. Use of a disaccharide compound comprised of an uronic acid residue and a glucosamine residue wherein the hydroxy group at position 6 and/or the amino group at position 2 of the glucosamine residue are/is sulfated are connected by α 1,4-glycosidic linkage or β 1,4-glycosidic linkage, or a salt thereof, for the production of a medicament for promoting HGF production.

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33. The use according to any one of claims 23 to 32, wherein the sugar chain compound or a salt thereof has no or reduced anti-blood coagulation activity and/or lipoprotein lipase releasing activity.